

## Q2 Inter-process Communication

### (I) Unix Domain Sockets

This code is for a server that sends a series of strings to a client over a Unix domain socket. The server generates 50 random strings and sends them in groups of 5 to the client. After each batch is sent, the server waits for 3 seconds and reads an acknowledgement ID from the client. The acknowledgement ID is the index of the next string to send. The server continues sending strings until it receives an acknowledgement ID of 49, indicating that all 50 strings have been sent. The server creates a Unix domain socket and listens for connections from a client. When a client connects, the server sends the strings and reads the acknowledgement ID. It then closes the socket when the process is finished. The **'write'** and **'read'** functions are used to send and receive data through the socket, and the **'close'** function is used to close the socket.

```
⊙ [Dhvanil DOMAIN_SOCKETS]# make run1
./socket_P1
The server socket was created
bind() returned success
listen() returned success
Waiting on accept()
accept() returned success
Random string 0: NmLRb
Random string 1: BMqbH
Random string 2: cdARZ
Random string 3: oMkky
Random string 4: hidDQ
Random string 5: scdxR
Random string 6: jMowf
Random string 7: RXSJY

⊙ [Dhvanil DOMAIN_SOCKETS]# make run2
./socket_P2
connect() returned success
ID 0: NmLRb
ID 1: BMqbH
ID 2: cdARZ
ID 3: oMkky
ID 4: hidDQ
-----
ID 5: scdxR
ID 6: jMowf
ID 7: RXSJY
ID 8: bLDBe
ID 9: fsaRc
```

### (II) FIFO's

50 random strings are sent in batches of 5 to a named pipe (FIFO). It then waits for 3 seconds and reads an acknowledgement ID from the named pipe. The acknowledgement ID is the index of the next string to send. The loop ends when the acknowledgement ID is 49, indicating that all 50 strings have been sent. The second program receives a batch of 5 strings from the named pipe, processes them, and sends an acknowledgement ID back to the first program. The

acknowledgement ID is the index of the next string to receive. The loop ends when the acknowledgement ID received is 49, indicating that all 50 strings have been received. The '**write**' and '**read**' functions are used to send and receive data through the named pipe, and the '**close**' function is used to close the named pipe.



```
[Dhvanil FIFO]# make run1
./fifo_p1
Random string 0: hWLRb
Random string 1: BkqBh
Random string 2: cdARZ
Random string 3: oWkKy
Random string 4: hldDQ
Random string 5: scdRr
Random string 6: jMowF
Random string 7: RKSJY
Random string 8: bLDBe
Random string 9: fsaRc
Random string 10: bVMeC
Random string 11: DvGcX
Random string 12: xPcLO

[Dhvanil FIFO]# make run2
./fifo_p2
ID 0: hWLRb
ID 1: BkqBh
ID 2: cdARZ
ID 3: oWkKy
ID 4: hldDQ
ID 5: scdRr
ID 6: jMowF
ID 7: RKSJY
ID 8: bLDBe
ID 9: fsaRc
ID 10: bVMeC
```

### (III) SHARED MEMORY SEGMENT

50 random strings are sent in batches of 5 to a shared memory segment. It then waits for 3 seconds and reads an acknowledgement ID from the shared memory segment. The acknowledgement ID is the index of the next string to send. The loop ends when the acknowledgement ID is 49, indicating that all 50 strings have been sent. The second program receives a batch of 5 strings from the shared memory segment, processes them, and sends an acknowledgement ID back to the first program. The acknowledgement ID is the index of the next string to receive. The loop ends when the acknowledgement ID received is 49, indicating that all 50 strings have been received. The shared memory segment is created and accessed using the '**shmget**' and '**shmat**' functions, and strings are copied using the '**strcpy**' and '**sprintf**' functions. The '**atoi**' function is used to convert strings to integers. The current time is obtained using the '**clock\_gettime**' function.

```
[Dhvani1 SHARED_MEMORY]# make run1
./shared_P1
Random String 0 : kXjIG
Random String 1 : LLWtT
Random String 2 : fFutD
Random String 3 : wTEOF
Random String 4 : JIKNo
Random String 5 : fieFC
Random String 6 : rpBax
Random String 7 : HLkeF
Random String 8 : djKxc
Random String 9 : OuVSj
Random String 10 : cCRMr
Random String 11 : grYkw
Random String 12 : BRWdc

[Dhvani1 SHARED_MEMORY]# make run2
./shared_P2
ID 0 : kXjIG
ID 1 : LLWtT
ID 2 : fFutD
ID 3 : wTEOF
ID 4 : JIKNo
-----
ID 5 : fieFC
ID 6 : rpBax
ID 7 : HLkeF
ID 8 : djKxc
ID 9 : OuVSj
-----
ID 10 : cCRMr
```

## Time Calculation Example:

```
-----
Acknowledged ID : 44
-----
Acknowledged ID : 49
-----
Total Time: 1616989808 ns
```